WHAT IS CLAIMED IS:

1. A permanent magnet type reluctance electric motor comprising:

a stator including a stator iron core and having armature coils placed inside slots; and

a rotor provided with a plurality of magnetic barriers formed by cavities and placed on an inner side of the stator in such a manner that sections where a magnetic flux can easily pass (d-axis) and sections where a magnetic flux cannot easily pass (q-axis) are alternately formed, and made of a rotor iron core having permanent magnets in cavities, characterized in that:

the rotor satisfies a relationship of $PL / 2\pi RW_{qave} \geqq 130$,

where W_{qave} [m] indicates an average thickness of the rotor iron core on an outer side in a radial direction of the rotor with respect to cavities arranged in a q-axis direction, L [m] indicates a width in a circumferential direction of the cavities, P indicates the number of poles and R [m] indicates the radius of the rotor.

2. A permanent magnet type reluctance electric motor according to claim 1, wherein the rotor satisfies a relationship of $PL / 2\pi RW_{qave} \geqq 200$.

3. A permanent magnet type reluctance electric motor according to claim 1, wherein the cavities

arranged in the q-axis direction are made to go through to an outer circumferential portion in a radial direction of the rotor.

sub A11 cancel'd.

4. A permanent magnet type reluctance electric motor comprising:

a stator including a stator iron core and having armature coils placed inside slots; and

a rotor provided with a plurality of magnetic barriers formed by cavities and placed on an inner side of the stator in such a manner that sections where a magnetic flux can easily pass (d-axis) and sections where a magnetic flux cannot easily pass (q-axis) are alternately formed, and made of a rotor iron core having permanent magnets in cavities, characterized in that the rotor satisfies a relationship of:

$$W_{dmin}P / 2\pi R \geqq 65,$$

where W_{dmin} [m] indicates a minimum distance between a cavity arranged in the q-axis direction and a permanent magnet, P indicates the number of poles and R [m] indicates the radius of the rotor.

5. A permanent magnet type reluctance electric motor according to claim 4, wherein the rotor is formed to have a structure which satisfies a relationship of: $W_{dmin}P / 2\pi R \geqq 87$.

6. A permanent magnet type reluctance electric motor comprising:

sub A12

a stator including a stator iron core and having

armature coils placed inside slots; and

a rotor provided with a plurality of magnetic barriers formed by cavities and placed on an inner side of the stator in such a manner that sections where a magnetic flux can easily pass (d-axis) and sections where a magnetic flux cannot easily pass (q-axis) are alternately formed, and made of a rotor iron core having permanent magnets in cavities, characterized in that the rotor satisfies a relationship of:

$$95 \leqq W_{dave}P / 2\pi R \leqq 160,$$

where W_{dave} [m] indicates an average distance between a cavity arranged in the q-axis direction and a permanent magnet, P indicates the number of poles and R [m] indicates the radius of the rotor.

7. A permanent magnet type reluctance electric motor according to claim 6, wherein the rotor satisfies a relationship of: $110 \leqq W_{dave}P / 2\pi R \leqq 130$.

8. A permanent magnet type reluctance electric motor according to claim 1, wherein the width in the radial direction of a cavity situated in the q-axis direction is increased towards the center in the q-axis direction.

9. A permanent magnet type reluctance electric motor according to claim 1, wherein the angle of the permanent magnets is changed so that the distance between a cavity situated in the q-axis direction and a permanent magnet becomes maximum at a position on an

inner diameter side of the center of the cavity in the q-axis direction.

10. A permanent magnet type reluctance electric motor comprising:

a stator including a stator iron core and having armature coils placed inside slots; and

a rotor provided with a plurality of magnetic barriers formed by cavities and placed on an inner side of the stator in such a manner that sections where a magnetic flux can easily pass (d-axis) and sections where a magnetic flux cannot easily pass (q-axis) are alternately formed, and made of a rotor iron core having permanent magnets in cavities, characterized in that the rotor satisfies a relationship of:

$$0.45 \leqq W_t / \tau \leqq 0.8,$$

where τ [m] indicates the pitch of the slot and W_t [m] indicates the width of the teeth.

11. A permanent magnet type reluctance electric motor according to claim 1, wherein the stator is formed to have a structure which satisfies a relationship of: $0.45 \leqq W_t / \tau \leqq 0.8$.